

***Prevention is better than cure***

Erasmus

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In the 21<sup>st</sup> century, statements such as “We cannot do anything to protect the environment (i.e., Biosphere) if it might endanger the economy” are frequent. However, prevention should always have the highest priority if human practices can push an ecosystem past a tipping point where change is irreversible (Solomon et al. 2009). The massive crude oil leak from British Petroleum in 2010 badly damaged the Gulf of Mexico and caused huge financial losses to the shrimp and fishing industries, tourism, and other types of recreation. Optimistic statements in the aftermath of this spill have announced diminished oil (probably because the toxic dispersants moved oil to the Gulf “floor”), but no statements are justified about the ecological condition. Another example of prevention not being heeded is the world’s oceans, which cover approximately 70% of Earth’s surface. They have changed from mildly alkaline to mildly acidic (carbon dioxide), which interferes with the use of calcium by marine organisms (among other effects). Once the oceans pass a major ecological tipping point, humankind will be in deep trouble. Marine fisheries are a major source of food for humankind, and prevention of irreversible change may not be possible if business as usual (i.e., unsustainable practices) continues.

*Earth has run out of room to expand fisheries, . . . researchers have used a newly created measurement for the ecological footprint of fisheries that allows them to determine the combined impact on all marine fisheries and their rate of expansion. Known as SeafoodPrint, it quantifies the amount of “primary production” — the microscopic organisms and plants at the bottom of the marine food chain — required to produce any given amount of fish (University of British Columbia 2010).*

In addition, since a “cure” for damaged wetlands is not well understood, prevention of change and damage to them makes sense. Earth’s wetlands occupy only a tiny percentage of the planet’s surface area, but are ecological “powerhouses” in terms of metabolic activity. Wetlands are critical in the recharge of underground aquifers, are nursery grounds for many species of fish, and are refuges for wildlife, especially migratory birds. Yet wetlands are drained for various types of development and are used to trap and transform hazardous materials. “Many coastal wetlands worldwide . . . may be more sensitive than previously thought to climate change and sea-level rise projections for the 21<sup>st</sup> century. . . . Accurate information about the adaptability of coastal wetlands to accelerations in sea-level rise . . . helps narrow the uncertainties associated with their disappearance” (USGS Report 2010).

The only biological system that can be touched by a human anywhere on Earth at any time is the Biosphere, which consists of a thin envelope of living species that covers Earth. The Biosphere cannot be seen around the circumference of the Earth from outer space.

The present Biosphere, the sixth, serves as a life support system for humankind and as a source of natural resources upon which the human economy depends. It has maintained conditions favorable to the human species for the thousands of years that the species has been on Earth. However, *Homo sapiens* has existed for only a tiny fraction of the time life has been on Earth (estimated to be 3.5 billion years). One assumption is that humans are apart from the Biosphere, not a part of it. This attitude is dangerous since it could be fatal to *Homo sapiens*. As a consequence, humankind fails to prevent actions that would slow the rate of climate change and is not disturbed by a 140% ecological overshoot (using resources faster than the biosphere can regenerate them) in 2010. Clearly, this lifestyle is unsustainable and can throw the current consumer society into disequilibrium. However, humankind continues to damage the Biosphere. What humankind should be doing is preventing further damage and repairing (curing) the damage it has already caused before the present Biosphere goes into disequilibrium and is replaced by a biosphere less favorable, even hostile, to *Homo sapiens*.

Why is humankind not protecting the Biosphere that is the foundation of the human economy? One reason may be a lack of knowledge of the critical role that the Biosphere plays in daily lives. Another strong probability is the fear that protecting the Biosphere (i.e., the environment) will require major adjustments in the growth economy.

Unfortunately, no “cure” for a damaged Biosphere exists except the evolution of a new Biosphere, which occurs over a considerable span of time. The new Biosphere will consist, if the five past major extinctions are reliable guides, of predominately new species. Another Biosphere will unlikely be as favorable to humans and their economy as the present Biosphere. The question becomes how to preserve a substantial portion of the species that still remain and the function of the system that supports the present life forms.

Science exists to prevent damage, but is not being used. Representatives from the world’s sovereign nations gathered in Cancun, Mexico, in 2010 to attend the Conference of Parties of the United Nations Framework Convention on Climate change. Regrettably, no agreements were reached on hard numbers or dates to reduce anthropogenic discharges of greenhouse gases (Union of Concerned Scientists 2010). In short, agreements on goals (such as reducing greenhouse gas emissions) and conditions to protect Earth’s climate so that catastrophes could be avoided (for which no “cure” exists) were not accomplished.

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